

National Imagery and Mapping Agency

BROAD AGENCY ANNOUNCEMENT (BAA)
FOR
Neuroscience-Enabled Computer Vision (NECV)
Solicitation NMA201-01-R-0005

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I. INTRODUCTION

The National Imagery and Mapping Agency (NIMA) announces a Fiscal Year 2001 competition for Neuroscience Enabled Computer Vision (NECV). The Advanced Research and Development Division of NIMA's Acquisition and Technology Directorate has identified better understanding of brain-based mechanisms of visual processing as an enabling technology area that has the potential to dramatically impact NIMA's mission. To realize this potential, NIMA is soliciting proposals for research at the intersection of the biological visual sciences and computer vision domains.

II. GENERAL INFORMATION

There are several efforts currently underway at NIMA related to this BAA. One is a Small Business Innovation Research (SBIR) project entitled "Neurobiologically Based System for Object Segmentation and Recognition." This work involves developing a neuroscience-inspired hierarchical architecture for segmentation and recognition of objects in imagery. Another project is a NIMA University Research Initiative (NURI) entitled "Pulse Image Processing" which is exploring the extraction of platonic icons and foveation centers from images through the use of pulse image processing. The project

“Aiding Image Analysts Through Rapid Serial Visual Presentation (RSVP) Training and Displays” is investigating and providing a proof-of-concept assessment of a new visualization method. Finally, “Brain-based Selection of Image Analysts (IAs)” is developing visual-spatial tests of key IA abilities, comparing the tests to standard clinical and aptitude tests, and correlating them to the underlying neural processes. The purpose of this BAA is not to duplicate on-going efforts, but rather to foster new ways to approach the problem of object detection, recognition, and identification.

III. AREA OF INTEREST— GENERAL

This BAA describes the NECV research area in [Section IV](#). This description provides proposers with a frame of reference for NIMA research interests. NIMA wants to encourage innovative ideas that address these interests. Proposers are urged to consider carefully the research issue posed and, as appropriate, to contact our research topic point of contact, Dr. Jeff Kretsch on (703) 262-4554 or at kretschj@nima.mil, to discuss potential efforts.

IV. RESEARCH TOPIC

NEUROSCIENCE ENABLED COMPUTER VISION

To achieve the mission of timely, relevant, and accurate analysis, NIMA’s research in Image Science has been focused on achieving two goals: improving analysts’ productivity, and automating tasks currently performed by analysts.

This initiative is intended to explore neuroscience inspiration to lead to fresh approaches to achieving these goals. NIMA seeks to fund research from the visual psychophysics, visual neuroscience, or computational neuroscience communities that will facilitate and inform the design of automated image processing systems. Any proposal falling under this broad domain will be carefully considered. Specific areas of interest include, but are not limited to, the following:

1. The comprehensive characterization of the statistics of natural scenes of overhead imagery that are relevant to human perception. This includes investigations of how the observed low and high-order statistical structure might be exploited to create a more effective automatic image processing systems and/or how knowledge of such structure might allow one to more accurately predict human performance.
2. The elucidation of how human experts recognize objects in overhead imagery. This could include, for example, such investigations as 1.) A psychophysical study of how the systematic manipulation of object or image features affects recognition performance, or 2.) How context is considered in the recognition process, but need not be restricted to either of these approaches.

3. The development of biomimetic algorithms that incorporate feedforward and feedback interactions to disambiguate object identity during target recognition.

It is important to note that proposals relying solely on traditional artificial neural networks or non-biological image processing techniques are not desired and will not be funded under this BAA. Submissions should clearly state how the proposed biologically based visual science research relates to advancing the current capabilities of computer vision systems.

V. CONDITIONS

This NECV competition is specifically for the research topic described in [Section IV](#). Proposers are advised to read this announcement carefully. It explains NIMA's research needs upon which the topic is based and the terms and conditions of this competition.

NIMA encourages and accepts proposals from consortia of teams, because research in this multidisciplinary topic may require strengths in multiple scientific fields. Offerors who propose a teaming arrangement must name one principal investigator as the responsible technical point-of-contact. Similarly, one university, Government lab, or company will be the primary awardee for purposes of award execution. Proposals must describe the relationship among the team and their respective roles in the technical proposal, as well as the apportionment of funds in the cost proposal.

NIMA expects that these research projects will promote application of defense research, primarily for defense purposes but also for commercial purposes. Therefore, a factor that will be used for evaluating proposals is the quality of planned interactions with research and development organizations that transition research findings to applications – particularly industrial organizations, Department of Defense laboratories, or other organizations that perform research and development for intelligence and defense applications. Examples of interactions are collaboration in the performance of the proposed research, exchange of scientific and engineering personnel, and exchanges of technical information. Each proposed interaction will be evaluated in the context of the entire proposal. Evaluation will be based on the likelihood that the proposed interaction positively impacts research outcomes and transition to application.

VI. REQUIREMENTS FOR PROPOSALS

A. General

NIMA intends to award all FY01 money with the first call for proposals. To be considered and evaluated in the first call, the Government must receive the full proposal by the due time/date as identified in [Section XI](#). However, NIMA will continue to accept and evaluate proposals until September 20, 2001. NIMA reserves the right to make additional awards for proposals received during the first call and for proposals received

through September 20, 2001, pending availability of additional funding. Proposals shall only be submitted to the e-mail addressees provided below. Proposals received after September 20, 2001 will be treated according to Federal Acquisition Regulation Clause 52.215-1 Instruction to Offerors—Competitive Acquisition (FEB 2000).

NIMA will send the Principal Investigator an acknowledgement of receipt of the proposal, and will follow-up with a notification announcing whether or not the proposal will be recommended for an award. Acknowledgement and notification will be sent via e-mail according to the schedule in [Section XI](#).

Proposals will be evaluated against criteria (1) through (7) in [Section VII](#). The estimated award date identified in [Section XI](#) should be used for budget and proposal purposes. All dates are subject to change.

B. Submission

Technical proposals and cost proposals shall be formatted ONLY as .pdf files. NIMA does not have electronic signature verification capability; therefore, submission of proposals as a .pdf file provides somewhat better security for protecting your proposals from unauthorized access and manipulation. In addition, all figures will be perfectly intact in a .pdf file.

Both technical and cost proposals shall reference BAA NMA201-01-R-0005.

Proposals shall be submitted electronically and simultaneously to eichelberk@nima.mil and to kretschj@nima.mil. Files that are too large for e-mail may be submitted by FTP to <ftp://164.214.2.65/pub/contracts/necv>. To ensure the NIMA can retrieve the FTP proposal, proposers must also provide an e-mail notification that your proposal has been sent via FTP.

C. Content

The proposal must be signed, complete, and self-contained to qualify for review. Proposals shall adequately describe the technical objectives and approaches, and the expenditures for equipment, all of which will be evaluated by qualified reviewers per [Section VII](#). Each page shall be 8 ½" by 11", with at least one-inch margins at top, bottom, and sides. Typeface shall be Times New Roman 12 pitch. Text shall be double-spaced, with the exception of the cost volume. Separate attachments, such as institutional brochures or reprints that are not germane to the proposal are discouraged.

Proposals shall include:

(1) Cover Page: Reference BAA number and title, identity of individual or team included in proposal, identity of principal investigator/program manager, proposed area(s) of interest, and title of official authorized to obligate contract and with whom negotiations should be conducted.

(2) Abstract: Provide a project summary no longer than one page.

(3) Technical: Limited to 25 pages, this section shall:

i. Describe in detail the research to be undertaken. State the objectives and approach and the relationship to state-of-knowledge in the field and to similar work in progress. Include appropriate literature citations and prior work. Discuss the nature of expected results.

ii. Describe the facilities available for accomplishment of research objectives. Describe the equipment planned for acquisition under this program and its application to objectives.

iii. Describe in detail proposed sub-awards or relevant collaborations (planned or in place) with industry, government organizations, or other appropriate institutions. Particularly, describe how collaborations are expected to facilitate the transition of research results to application. If sub-awards are proposed, make clear the division of research activities and provide detailed budgets for the proposed sub-awards. Descriptions of industrial collaborations shall explain how the proposed research would impact the industrial partner's research and/or product development activities.

iv. Identify other parties to whom the proposal has been/will be sent.

(4) Personnel: Describe the qualifications of the Principal Investigator and other key researchers involved in the project. For consortia or collaborations, one individual shall be the designated principal investigator for purposes of technical responsibility and contact. The page limit shall be two (2) pages per person, up to a limit of 4 persons.

(5) Past Performance: Provide three (3) past performance references. Each reference can be no more than two (2) pages in length. Each reference must contain a POC name, phone number, e-mail address, address, contract number and a brief description of the effort.

(6) Cost: Beginning on a new page, this section shall contain cost estimates sufficiently detailed for meaningful evaluation, including cost details for proposed sub-awards. For proposal purposes, use the estimated award start date per [Section XI](#). The cost proposal must include the total cost of the project, as well as a breakdown of the amount(s) by source(s) of funding (e.g., funds requested from the National Imagery and Mapping Agency and non-federal funds to be provided as cost sharing). The costs shall be broken down for each year of the program. There is no page limit for the cost/price proposal and it may be single-spaced. However, the cost proposal may only include cost/price-related information. Cost elements shall include but are not limited to:

i. Time being charged to the project, for whom (principal investigator, programmer, etc.), and the commensurate direct labor rates and benefits;

- ii. All indirect rates;
- iii. Estimate of material and operating costs;
- iv. Costs of equipment, based on most recent quotations and broken down in sufficient detail for evaluation (equipment costs should be budgeted primarily during the first year). Allowable equipment will ordinarily be limited to research equipment and apparatus not already available for the conduct of the work. General-purpose equipment, such as personal computers, is not eligible for support unless primarily or exclusively used in the actual conduct of scientific research;
- v. Travel costs and time, and the relevance to stated objectives. This shall include a breakdown of the number of travelers, location, duration, estimate costs for transportation, rental car and per-diem;
- vi. Publication and report costs;
- vii. Subcontract costs and type (the portion of work to be subcontracted and rationale); note that subcontract costs must be described carefully in both the text and the cost section;
- viii. Consultant fees (indicating daily or hourly rate) and travel expenses and the nature and relevance of such costs;
- ix. Communications costs not included in overhead;
- x. Other direct costs;
- xi. Annual total costs for the year;
- xii. Proposed fee; and
- xiii. Indicate if company or entity has established Forward Pricing Rate Agreements (FPRA), if company or entity has been audited by the Defense Contract Audit Agency (DCAA) within the past year, or if the company or entity has a cognizant Defense Contract Management Agency (DCMA) office.

D. Deliverables

The following deliverable items are required for each contract awarded under this BAA:

1. Cost and technical report every two months;
2. Program Report at the end of the basic effort;
3. Scientific and Technical Reports;

4. Interim status presentation and final presentation of the research results at one of the NIMA Washington Metropolitan Area sites;
5. Presentation Materials for all reviews and demonstrations/presentations;
6. All software, hardware, and supporting engineering and technical documentation developed under activities funded under this BAA. The Government has unlimited rights to data and software, with the exception of embedded COTS products that are enhanced using funds from this BAA;
7. Final program report that includes summary of achievement, outstanding issues, and research goals met, partially met, and what would be required to achieve those not accomplished. Distribution of the final report is a public release. Any proprietary information shall be attached to the final report.

NOTE: Results of research of awarded proposals shall be written as a paper in a manner suitable for publication in a national/international peer reviewed journal or professional journal.

VII. EVALUATION CRITERIA AND SELECTION PROCESS

A. **Criteria.** All seven of the following criteria will be used to evaluate final proposals.

The two primary evaluation criteria, of equal weight, are:

1. Scientific and technical merits of the proposed research; and
2. Relevance and potential contributions of the research to intelligence and defense missions.

Other evaluation criteria, of lesser importance than (1) and (2) but equal to each other, are:

3. The qualifications of the principal investigator and other key research personnel;
4. The realism and reasonableness of cost, including proposed cost sharing;
5. Past performance;
6. The adequacy of current or planned facilities and equipment to accomplish the research objectives; and
7. The impact of interactions with other organizations engaged in related research and development, in particular, industrial organizations, Department of Defense laboratories and other organizations that perform research and development for intelligence and defense applications.

B. Process

Proposals will undergo a multi-stage review. First, technical evaluation team members will review proposals independently using the criteria in this Section. The evaluation team chair will then convene their technical and cost evaluation teams and, through consensus, score each proposal, categorize each as selectable or not selectable, and

identify any proposal area requiring discussion. After evaluation, the teams will consider for the selectable proposals the scores, the available funding, and the strengths, weaknesses, and risks associated with each, and determine which, if any, proposals to recommend for negotiation for possible contract award.

C. Evaluation by Consultants

Offerors are advised that non-Government consultants may assist the Government during the Government's evaluation of proposals. These persons shall be authorized access to only those portions of the proposal data and discussions that are necessary to enable them to provide specific technical advice on specialized matters or on particular problems. They shall be expressly prohibited from scoring, ranking, or recommending the selection of a source.

It is anticipated that MITRE personnel will help in the evaluation process and throughout the life of the any resultant awards. MITRE is a federally funded research and development center. Contractor personnel will have signed a non-disclosure statement with the Government.

VIII. AWARDS

Through this NECV competition, it is anticipated that approximately 1 to 3 awards will result from this BAA subject to the availability of funds. All awards will be based on merit competition. The anticipated funding is \$660,000. However, the funds available may not necessarily be divided equally among awards. Awards will be made at funding levels commensurate with the research and in response to Agency mission. Awards generally will be made for two years. The Government will evaluate the proposal in light of the evaluation criteria set forth in this BAA. The Government reserves the right to award more or less than this estimate. Negotiations may result in funding levels less than originally proposed. Awards are expected to be in place by the start date identified in [Section XI](#). Dates provided are only estimates and are subject to change.

IX. CONTRACT TYPE

The Government intends to award Cost Plus Fixed Fee contract(s) as a result of this BAA. Successful offerors must have an accounting system that is adequate for determining costs applicable to the contract. Successful offeror's accounting systems will be subject to Defense Contract Audit Agency (DCAA) review, which may result in an adjustment of billing rates. Offerors are welcome to propose alternative contract types for consideration only.

X. CONTRACTUAL REQUIREMENTS

The following clauses shall be included in any resulting contract/agreement:

1. NIMA Clause 5552.227-9000, Unauthorized Use of NIMA Name, Seal, and Initials. As provided in 10 U.S.C. 2422, no person may, except with the written permission of the Director, National Imagery and Mapping Agency, knowingly use the words "National Imagery and Mapping Agency" or "Defense Mapping Agency", the initials "NIMA" or "DMA", the seal of the National Imagery and Mapping Agency or the Defense Mapping Agency, or any colorable imitation of such words, initials, or seal in connection with any merchandise, retail product, impersonation, solicitation, or commercial activity in a manner reasonably calculated to convey the impression that such use is approved, endorsed, or authorized by the Director, NIMA. Whenever it appears to the director, NIMA that any person is engaged or about to engage in an act or practice which constitutes or will constitute conduct prohibited by paragraph (a), the Attorney General may initiate a civil proceeding in a district court of the United States to enjoin such act or practice. Such court shall proceed as soon as practicable to hearing and determination of such action and may, at any time before such final determination enter such restraining orders or prohibitions, or take such other action as is warranted, to prevent injury to the United States, or to any person or class of persons for whose protection the action is brought.

2. DFARS Clause 252.204-7000 Disclosure of Information (DEC 1991).

(a) The contractor shall not release to anyone outside the Contractor's organization any unclassified information, regardless of medium (e.g., film, tape, document), pertaining to any part of this contract or any program related to this contract, unless (1) the Contracting Officer has given prior written approval; or (2) the information is otherwise in the public domain before the date of release. (b) Requests for approval shall identify the specific information to be released, the medium to be used, and the purpose for the release. The Contractor shall submit its request to the Contracting Officer at least 45 days before the proposed date for release. (c) The Contractor agrees to include a similar requirement in each subcontract under this contract. Subcontractors shall submit requests for authorization to release through the prime contractor to the Contracting Officer.

3. Intention to Use Consultants

(a) The Government intends to utilize the services of non-government engineering organizations in technical, advisory and consulting roles for overall technical review of the activities covered by this contract. Although the consultants shall not have the right of technical direction, they shall from time to time and on a frequent basis attend technical reviews, participate in technical interchange meetings, observe national processing, witness fabrication and assembly, and monitor testing within the contractor and subcontractor facilities. Such consultants will be involved in providing advice to the Government concerning viability of technical approaches, utilization of acceptable procedures, value and results of tests, and the like. The consultants will thus require access to program-related contractor facilities and documentation. Contractor proprietary data shall not be made available to consultants unless and until a protection agreement

has been generated between the consultant and the contractor and evidence of such agreement made available to the Government. Contractor proprietary cost and accounting will not be made available to consultant organizations.

(b) It is expressly understood that the operations of this clause will not be the basis for an equitable adjustment.

NOTE: Contractor personnel will have signed non-disclosure statements with the Government.

Other Pertinent Information

1. Registration in the DOD's Central Contractor Registry (CCR) database will be a prerequisite for receiving an award resulting from this solicitation. Proposals must reflect compliance or initiation of compliance with this regulation. Call 1-888-227-2423 or access via Internet at <http://ccr2000.com/> for more information. Offeror's DUNS number (and CAGE code if one has been assigned) must accompany proposal in order to verify CCR registration. Proposals must identify the Offeror's taxpayer identification number.
2. Representations and certifications are not required for inclusion in the proposal but will be provided for completion upon determination that an offeror's proposal has been selected for award. All applicable certifications and representations must be compliant and signed by an individual with the authority to bind the offering entity prior to award. Representations and certifications will be provided with the notification of intent to award.
3. The information provided in this BAA, in addition to that provided in the Commerce Business Daily (CBD) Announcement; constitutes a competitive selection as contemplated in FAR 6.102(d)(2)(1). In the case of the Principal Investigator leaving the organization he (she) is representing, the Government has the right to terminate the contract.
4. This announcement represents the totality of available information regarding this acquisition. Requests for hard copies of the Commerce Business Daily (CBD) announcement will not be honored. Interested parties may stay apprised of this solicitation including revision information and answers to submitted questions by checking this web-site daily (<http://164.214.2.59/poc/contracts/contracts.html>).

XI. SIGNIFICANT DATES

The following table provides the significant dates referred to in the body of this announcement.

ACTION	RESPONSIBILITY	DUE DATE/TIME
Issue announcement in Commerce Business Daily	Government	3/20/01
Proposals Due (first call)	Principle Investigator	5/7/01 1400 EST
Acknowledge Receipt of Proposals	Government	5/9/01
Notification of Intent to Award	Government	6/28/01
Estimated Start Date	Principle Investigator	7/18/01
Proposals Due (last call)	Principle Investigator	9/20/01 1400 EST

Contracting POC: Karen Eichelberger (301) 227-7830

Technical POC: Dr. Jeff Kretsch (703) 262-4554